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How to Change the S-Series Crankshaft Position Sensor (CPS)

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01-29-2006, 05:59 PM #1

Razorbak
Master Member

Join Date: Aug 2004
Location: Chicagoland
Posts: 2,860
[Razorbak's Photos](#)

1996 SL2

How to Change the S-Series Crankshaft Position Sensor (CPS)

This is not a difficult task, other than access to the sensor.

It's mounted by a single 10 mm bolt on the intake side of the engine block, hidden behind the starter. Access the sensor from below the vehicle. It helps to use an automotive extension mirror to see behind the starter.

Once you get a socket on it, your almost home.

This is what it looks like from below, using an automotive extension mirror...



Here's a close-up of the sensor itself... The CPS is the long one on the bottom right...



When installed, it's located on the intake side of the block (rear of the engine bay, near the firewall), between the two oil galley plugs behind the 3rd and 4th cylinders, just above the mail oil galley...



Since it has an O-ring around the shaft, if it's been in place for very long, you may have to twist it a bit to break it free. It's a good idea to replace the O-ring to prevent leaks, and lube it with a drop of oil to prevent it from being nicked during installation.

REWARD EXCELLENCE!
☒ Rate the quality of this post and help Razorbak reputation points. Click the reputation button near the bottom left corner of this message box. Thank you!

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03-21-2006, 04:58 PM #2

Algeo
Junior Member

Join Date: Oct 2005

Re: How to Change the S-Series Crankshaft Position Sensor (CPS)

What is the torque spec for the 10mm bolt?

Posts: 12 Algeo's Photos	REWARD EXCELLENCE! Rate the quality of this post and help <i>Algeo</i> reputation points. Click the reputation button near the bottom left corner of this message box. Thank you!
03-28-2006, 11:08 AM Algeo Junior Member Join Date: Oct 2005 Posts: 12 Algeo's Photos	Re: How to Change the S-Series Crankshaft Position Sensor (CPS) Nevermind about the torque, I doubt you would be able to fit a torque wrench in there. I used a racheting box 10mm wrench and it worked great. It is quite tight in there, I did it mostly just by feel. I had a friend watch from the top of the engine with the intake hose removed, to make sure I didn't damage anything else in the area. It would have been very hard to find this without the how-to article, thanks! So far, so good, ~60 miles since the change and no stalling! REWARD EXCELLENCE! Rate the quality of this post and help <i>Algeo</i> reputation points. Click the reputation button near the bottom left corner of this message box. Thank you!
03-28-2006, 02:39 PM DeCaff2006 Advanced Member Join Date: Jan 2006 Location: Hazleton, PA Posts: 948 1999 SL2 1994 SC2	Re: How to Change the S-Series Crankshaft Position Sensor (CPS) is it the same for SOHC and DOHC? REWARD EXCELLENCE! Rate the quality of this post and help <i>DeCaff2006</i> reputation points. Click the reputation button near the bottom left corner of this message box. Thank you!
03-31-2006, 12:01 AM madpogue Super Member Join Date: Sep 2004 Location: Madison, WI USA Posts: 25,715 madpogue's Photos 1996 SW2	Re: How to Change the S-Series Crankshaft Position Sensor (CPS) Quote: Originally Posted by DeCaff2006 <i>is it the same for SOHC and DOHC?</i> Yup. Same block. REWARD EXCELLENCE! Rate the quality of this post and help <i>madpogue</i> reputation points. Click the reputation button near the bottom left corner of this message box. Thank you!
04-01-2006, 07:54 PM Razorbak Master Member Join Date: Aug 2004 Location: Chicagoland Posts: 2,860 Razorbak's Photos 1996 SL2	Re: How to Change the S-Series Crankshaft Position Sensor (CPS) Quote: Originally Posted by Algeo <i>What is the torque spec for the 10mm bolt?</i> Sorry I didn't see this question earlier. I've been on the road for several weeks. The torque spec is 9 Nm (80 in-lbs). Quote: It would have been very hard to find this without the how-to article, thanks! So far, so good, ~60 miles since the change and no stalling! Glad you found it helpful. Congratulations on a successful repair! REWARD EXCELLENCE! Rate the quality of this post and help <i>Razorbak</i> reputation points. Click the reputation button near the bottom left corner of this message box. Thank you!
04-02-2006, 02:23 PM peppermj Advanced Member	Re: How to Change the S-Series Crankshaft Position Sensor (CPS)



Join Date: Feb 2005
Location: Pgh. Pa,
Posts: 906

[peppermj's Photos](#)

1996 SC2

Rb, Thanxs for an informative thread.

REWARD EXCELLENCE!
 Rate the quality of this post and help *peppermj* reputation points. Click the reputation button near the bottom left corner of this message box. Thank you!

 quote  



Join Date: Aug 2002
Location: Maryland
Posts: 9

Re: How to Change the S-Series Crankshaft Position Sensor (CPS)

SATURN Crankshaft Learn Procedure

1) The Powertrain Control Module (PCM) uses crankshaft velocity calculations to determine engine misfire and to operate engine misfire self-diagnostics. PCM must know precisely the variation between notches on the crankshaft. PCM contains crankshaft learn procedure which learns the variation between notches on crankshaft. **The crankshaft learn procedure must be reset if PCM, crankshaft, or crankshaft position sensor are replaced.**

2) If crankshaft learn procedure is being performed as a result of replacing the crankshaft, reset crankshaft learn procedure using Scan Tool equipment and manufacturer's instructions. If replacing PCM with a replacement PCM, procedure will be prompted automatically. Allow engine to idle until SERVICE light flashes. Hold engine speed between 3000-4000 RPM until light goes off after about 10-20 seconds.

NOTE: If any Diagnostic Trouble Codes (DTC) exist that relate to an engine misfire, crankshaft learn procedure will not be initiated. Any DTCs for engine misfire must be corrected before performing crankshaft learn procedure.

REWARD EXCELLENCE!
 Rate the quality of this post and help *bobcolvin* reputation points. Click the reputation button near the bottom left corner of this message box. Thank you!

 quote  



Join Date: Dec 2007
Posts: 36

[acemueller's Photos](#)

1998 SL
1992 SL2

Re: How to Change the S-Series Crankshaft Position Sensor (CPS)

This thread was really helpful since I couldn't even see my CPS on my 92 SL2. Just a couple layman's observations:

1. Believe Razorbak! You have to get at it from the bottom. If you pull the feed to the air cleaner, you may get a visual on it; I found it therepotic to look at it now and again; but as he said, it's done entirely blind! I had the car on 6" ramps, and on my back with my feet sticking out forward, and my head well behind the engine, I was able to get the best access.
2. Razorbak also mentioned twisting. That was the real salvation for me. Even that was hard at first, but twisting got progressively easier very quickly, so don't give up! Then it popped right out.
3. The last post mentioned the Crankshaft Learn Procedure, but it is a little vague. Research on other posts on this site suggest that one need not mess with that except maybe in the case of a 1996. In my case (1992), I did nothing and it has run fine so far.

Thanks all for the tips!

Thomas.

REWARD EXCELLENCE!
 Rate the quality of this post and help *acemueller* reputation points. Click the reputation button near the bottom left corner of this message box. Thank you!

 quote  



Join Date: Jan 2004
Location: Round Lake Beach, IL
Posts: 161

[MrWhsprs's Photos](#)

Re: How to Change the S-Series Crankshaft Position Sensor (CPS)

I just did this procedure yesterday on our '99 SW2, and I knew most of what to expect thanks to the helpful resources of this forum (this thread being a good example), and these videos by richpin on YouTube:

Replacing(CPS) Crankshaft Position Sensor
<http://www.youtube.com/watch?v=PVTFfOwqNZM>

Crankshaft Position Sensor Location
http://www.youtube.com/watch?v=QKb_TTQo0J4

A couple of notes from my experience:

11-22-2013, 11:58 AM

#11

Consultant

Junior Member

Join Date: Nov 2008

Location: Northeast

Posts: 12

1996 SL2

Some (including richpin in his video) recommend removing the starter but I didn't, so with the starter in place, replacing the CPS is done blindly, reaching up and around the starter.

I disconnected the battery since getting to the CPS involves working so closely to the starter (I believe that at times my arm was touching the wires).

Aside from the process of getting the front of the car safely up on jackstands, the most time-consuming aspect for me was disconnecting the electrical connector to the CPS. I was afraid of breaking the tab on the connector by brute-forcing it. So, I was trying to gently pry the tab AND pull the connector off simultaneously, using one hand (I found it too cramped to get both hands to the CPS). I tried that for a while but it didn't seem to be working, so I gently wedged a thin tool in between the tab and the CPS and then was able to wiggle the connector out.

Once the connector was off, the rest of the job was quick and pretty easy, again given that the whole thing is done blindly.

I used a small 1/4" drive ratchet, and getting the 10mm bolt out was easy. In terms of providing clearance to use the ratchet I found that a regular (short) socket was too short, and the short socket on a short (2", I think) extension was too long. So I used a deep 10mm socket and that was perfect. Long enough to put the ratchet at the right height to clear the starter but not too long that other things were in the way.

I twisted the CPS to break it free, and then twisted it back and forth some more while pulling on it, and it came free with a POP sound.

The CPS I bought (~\$25 including tax, at Carquest) came with an O-ring already installed so I didn't have to swap it over from the old one. I smeared a little engine oil around the O-ring on the new CPS, inserted the new CPS and pushed until it was fully seated.

I threaded the bolt by hand until finger-tight, and snugged it down with the ratchet. Snapped in the electrical connector on the CPS, reconnected the battery, and started the car!

...

<> Mike

2000 SL2: SOLD 2018-06-01 with 197,076 mi. (Replaced with 2010 Toyota Prius)

1999 SW2: TOTALED 2014-06-14 with 269,454mi. (Replaced with 2006 Ford Escape Hybrid)

REWARD EXCELLENCE!

Rate the quality of this post and help *MrWhsprs* reputation points. Click the reputation button near the bottom left corner of this message box. Thank you!

quote

Consultant

Junior Member

Join Date: Nov 2008

Location: Northeast

Posts: 12

1996 SL2

Re: How to Change the S-Series Crankshaft Position Sensor (CPS)

Just did this procedure on a 1996 SL2 - had the 'dead car' (crank but no start everything checks OK) - CPS was indicated by process of exclusion and resistance test.

Tip - the plug in the front of the Program Control Module (PCM) has the purple and yellow leads that go to the CPS - you can measure resistance there. (Just remove the little plastic pre-heat air box to get to it) Mine had very high resistance - 1740 ohms. Should be 700-900 ohms

Really can't see doing the replacement without first removing the starter (which I had previously replaced) but your mileage may vary. Watch the RichPin videos on both removing the starter and replacing the CPS - you're all set

Watch RichPin's technique to get the CPS connector off - just gently pry the little clip in the back and at the same time gently the connector out with a screwdriver. Twist the CPS and if necessary - slip a screwdriver under it to pop it up. Not much force required in any of this.

reassembly is pretty quick - which RichPin's video for the hidden bolt technique with the starter's upper bolt (use tape in the socket to hold the bolt in.)

Checked to see that all the DTCs had been cleared (I have an aftermarket scan tool that plugs into the ODB socket)- didn't get any relearn (flashing service light) indicator - just started (a bit flooded due to some cranking while dead) and let idle.

After that - let it warm up and drove around the neighbor hood - seemed a lot more responsive - better shifting and pickup. Starts immediately.

Tip #1 - if you are replacing the starter - may as well replace the CPS at the same time. CPS cost \$16 at AutoZone (slightly less at Rock Auto) - Come to think of it - may as well replace the starter (if you haven't already) when replacing the CPS. If you don't - what you save in money today you will pay for in aggravation later when it fails.

Tip #2 - you can get the Saturn Powertrain Contols service manual on eBay for \$15-\$30. Short money if you are going to diagnose problems with a Saturn - and want the factory info.

REWARD EXCELLENCE!

Rate the quality of this post and help *Consultant* reputation points. Click the reputation button near the bottom left corner of this message box. Thank you!

quote

drivewayguy

New Member

Re: How to Change the S-Series Crankshaft Position Sensor (CPS)

Join Date: Mar 2014 Posts: 4	I do not like stepping on toes kind of thing. Great info, however, if you take off the starter, which is simple. it makes it way easier to get at the CPS. REWARD EXCELLENCE! Rate the quality of this post and help <i>drivewayguy</i> reputation points. Click the reputation button near the bottom left corner of this message box. Thank you!
08-28-2014, 03:29 AM Stanley_Krute Member Join Date: Jan 2011 Posts: 95 Stanley_Krute's Photos 1999 SW2 1999 SL1	#13 Re: How to Change the S-Series Crankshaft Position Sensor (CPS) I do not do well operating blind, so razorbak's technique was beyond me. Couldn't find my telescoping little auto mirror, which I imagine might've made this possible for me. I tried removing the starter, per richpin's video and posts in this thread, but that nastily-hard-to-get-to upper bolt flummoxed me. However, here is what worked nicely: I removed the passenger side tire/wheel and plastic splash shrouding. That allowed me to get a very clear view of the sensor, its clip, and its bolt. Hope that helps others it made this task v. easy -- stan <i>Last edited by Stanley_Krute; 08-28-2014 at 03:38 AM..</i> REWARD EXCELLENCE! Rate the quality of this post and help <i>Stanley_Krute</i> reputation points. Click the reputation button near the bottom left corner of this message box. Thank you!
11-25-2017, 08:26 PM Gundy New Member Join Date: Apr 2013 Location: Richfield, MN Posts: 7 2000 SL2 1999 SL2	#14 Re: How to Change the S-Series Crankshaft Position Sensor (CPS) I just had the CPS fail in my son's 1999 SL2. He ended up stranded on the freeway in the left lane (no shoulder) the day before Thanksgiving, so he backed up traffic for several miles. 😊 He ended up able to start it in about 20 minutes after it died and got off the freeway (after many people honking at him and giving him the finger!). I met him where it stalled again, it started in another 20 minutes, then I drove it home. The next day I started looking at it and it would start right up cold, but after it warmed up a bit it would stall out and then not start, until it cooled down a bit, then it would start again. Thankfully, after a while I could replicate it. I assumed it was the fuel pump, but checked pressure at the rail and she was holding at 50 PSI. I could also hear the fuel pump "whirr" when turning the key, so that was a good sign too. I next used an inline spark tester and the car had zero spark after it stalled and I attempted to start it again. I was then thinking it was the ICM, and ended up changing that out, but it didn't solve the problem. I didn't think it was the CPS because that only had 30-40K on it...from when I changed it the last time. Well, \$20 spent on a new CPS at NAPA and the problem is NO MORE! I've now changed the CPS out 3 times (have another 2000 Saturn SL2) and I just do it by feel now. Thanks everybody for your posts, this really helped me in figuring the issue out! Hopefully this post helps someone troubleshoot their situation as well. <i>Last edited by Gundy; 11-25-2017 at 08:27 PM.. Reason: forgot word</i> REWARD EXCELLENCE! Rate the quality of this post and help <i>Gundy</i> reputation points. Click the reputation button near the bottom left corner of this message box. Thank you!
12-01-2017, 02:02 PM CamoTurtleSat New Member Join Date: Dec 2017 Location: New York State Posts: 1 1999 SL1	#15 Re: How to Change the S-Series Crankshaft Position Sensor (CPS) Ok so to clarify on my 1999 Saturn SL1 if the engine cranks but doesn't fire I need to re place said sensor ? If yes, do I have to do the rpm "resettrick"? REWARD EXCELLENCE! Rate the quality of this post and help <i>CamoTurtleSat</i> reputation points. Click the reputation button near the bottom left corner of this message box. Thank you!
12-01-2017, 03:02 PM fdryer Super Member 	#16 Re: How to Change the S-Series Crankshaft Position Sensor (CPS) There is no yes/no answer to your question because you haven't given any info to conclude your question is leading to a dead crank sensor. To determine if a cranks sensor failed requires checking two failed issues first; zero spark to all plugs and zero injector operation. You must verify at least the loss of spark and injector operation before concluding a dead



Join Date: Jan 2006
Location: NYC
Posts: 43,471

[fdryer's Photos](#) 

2003 L-Series 3.0L Sedan



crank sensor. If you have spark or injector operation (wet plugs), the crank sensor didn't fail.

Troubleshooting at home requires testing for the usual reasons for an engine not starting, missing fuel or spark.

If you think the crank sensor is dead but won't check the easy stuff first, you may be working backwards but can still test for a good crank sensor. Remove it and measure its resistance. Resistance should be between 700-1200 ohms. Your '99 doesn't require a crank relearn procedure. Your crank sensor is plug n' play.

REWARD EXCELLENCE!

 Rate the quality of this post and help [fdryer](#) reputation points. Click the reputation button near the bottom left corner of this message box. Thank you!

  

08-06-2018, 04:05 AM

[arabquarter](#)
New Member


Join Date: Aug 2018
Posts: 1



Had a Brand New (Bad) S-Series Crankshaft Position Sensor (CPS) from Napa Auto Parts

I wanted to share my story so others may learn from my experiences. I have a 1998 Saturn SW2 DOHC 1.9 Liter and around early July of 2018 it has 80,000 miles on it. I was trying to start my vehicle and it wasn't starting. I could smell gas so I held the accelerator to the floor and eventually it started. After it started the Service Engine Soon Light came on and a code P0336 Crankshaft Position Sensor 'A' Circuit Range/Performance.

A week later I was driving my vehicle and it started only firing on 2 cylinders. The shop replaced a bad coil for spark plugs 2 and 3 as it had shorted and also took out the ignition control module which that also had to be replaced. The vehicle ran much better, but had trouble idling back to 800 rpms and was stuck at around 1000 rpms, but it did eventually get better. I had the idle air control valve replace and I replaced the positive crankcase ventilation valve as both had a fair amount of carbon on them.

A couple of days later the vehicle wouldn't start after it got warm. I remembered the P0336 code and had the shop replace the Crankshaft Position Sensor from Napa. I picked up the vehicle, stopped at a grocery store, then stopped to meet a friend and again the vehicle wouldn't start. The vehicle would cool down and then it would start.

This time the Service Engine Soon light did not illuminate so the vehicle went back to the shop again. There was no code stored, but I told the shop that the P0336 code does not show itself in about 99% of the cases according to the posts from another saturn blogger.

I told the shop that I was an electronics technician once upon a time at Montgomery Wards and that I had a Sony Color TV that had no picture. I replaced the microprocessor with a new Sony Microprocessor and had picture but now no color. I measured the voltages on the various pins of the microprocessor and determined that the new Sony Microprocessor was indeed bad. I ordered the new Sony Microprocessor once again and installed it and this time the TV works as it should.

I told the shop if the symptoms change and you have only replaced a single part with a brand new part than that new part must be bad. Sure enough the Crankshaft Position Sensor was replaced again with another new Crankshaft Position Sensor from Napa and now the vehicle works just fine.

REWARD EXCELLENCE!

 Rate the quality of this post and help [arabquarter](#) reputation points. Click the reputation button near the bottom left corner of this message box. Thank you!

  

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